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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, L.L.P. 1940 DUKE STREET ALEXANDRIA, VA 22314				
EXAMINER				
NUCKOLS, TIFFANY Z				
ART UNIT		PAPER NUMBER		
1716				
NOTIFICATION DATE		DELIVERY MODE		
11/12/2010		ELECTRONIC		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com

oblonpat@oblon.com

jgardner@oblon.com

# Office Action Summary

**Application No.**

10/587,390

**Applicant(s)**

HAMELIN, THOMAS

**Examiner**

TIFFANY NUCKOLS

**Art Unit**

1716

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 26 August 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-31 and 45-49 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-31 and 45-49 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 July 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/06)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_
- Paper No(s)/Mail Date \_\_\_\_\_

**DETAILED ACTION**

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 08/26/2010 has been entered.

***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 26 recites the limitation "the contact zone" in the last line of the claim. There is insufficient antecedent basis for this limitation in the claim. For the purposes of examining based on the merits and upon further examination of the application, "the contact zone" will be interpreted as the "fluid gap."

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. **Claims 1-4, 8-20, 26-31 and 48 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5730803 to Steger et al.**

6. At the outset, it is noted in regards to Claim 26 that the recitation of "means for" limitations are considered to invoke the provisions of 35 U.S.C. 112, sixth paragraph. This recitation has been interpreted in accordance with the Specification and the dependent claims to refer to the following:

Claim 26:

- a. Means for preventing the flow of the brazing material into the contact zone: comprises a groove (Claim 27).
7. In regards to Claims 1 and 48, Steger teaches a substrate holder 300 Fig. 3A for supporting a substrate (implicitly on top surface 303) comprising a supporting surface 303, a cooling component 333 having a plurality of cooling channels 334 configured to receive a cooling fluid, a heating component 308, 310 positioned adjacent to the supporting surface 303 and between the supporting surface and the cooling component 333, a fluid gap 320 positioned between the cooling component and the heating component such that the fluid gap is interposed between the plurality of cooling channels of the cooling component and the heating component, the fluid gap configured to receive a fluid 322 to vary the thermal conductance between the cooling component and the heating component; and a brazing material 324 disposed at least along a peripheral region between the cooling component and the heating component as it is disposed adjacent the fluid gap to close the fluid gap at that top portion, i.e., provide a part of an enclosure which forms the fluid gap, and formed radially inward of the peripheral region as it forms a plurality of discrete fluid gaps between the cooling component and the heating component (Col. 2 lines 49-54, Col. 6 line 31-Col. 9 line 54).

8. In regards to Claim 2, 3, 8, and 9, Steger teaches heating component is comprised of a body portion 308 and an embedded heater 310 disposed in the body portion, the body portion 301 being made of alumina, an aluminum alloy.
9. In regards to Claim 4, Steger teaches the cooling component 333 comprises an upper cap 330 and a lower cap 332.
10. In regards to Claims 10, 11, and 12, Steger teaches the fluid gaps are cylindrical in shape, i.e., round grooves that are a portion of the substrate holder called the heat transfer plate, which can be associated with being part of the heating component or the cooling component as a means to transfer thermal energy, and thus can be considered either disposed in the heating component or the cooling component, or both, as broadly recited in the claims.
11. In regards to Claims 13, 17, 26 and 27, Steger teaches at least one isolating groove, i.e., a plurality 318 positioned between the cooling component and the heating component, the isolating groove configured to prevent flow of the brazing material into the fluid gap (see where brazing material 324 is separated from the fluid gap 320 by isolating groove 318 Fig. 3A).
12. In regards to Claims 14, 15, 16, 28, 29, 30 and 31, Steger teaches the fluid gaps and the isolating grooves are in a portion of the substrate holder called the heat transfer plate, which can be associated with being part of the heating component or the cooling component as a means to transfer thermal energy, and thus can be considered either disposed in the heating component or the cooling component, or both, as broadly recited in the claims.

13. In regards to Claim 18, Steger teaches the isolating grooves in plurality are concentric, as suggested in the presence and arrangement of 320 in Fig. 6A, and thus also implicitly, 318, i.e., the isolating grooves.

14. In regards to Claim 19, Steger teaches a first isolating groove (318 on the left of one of the 320) and a second isolating groove (318 on the right of one of the 320) positioned between the heating component and the cooling component and on opposite sides of the fluid gap, as they are on right and left sides of 320, the isolating grooves configured to prevent flow of the brazing material into the fluid gap, as evidenced by the location of 324 separate from 320.

15. In regards to Claim 20, Steger teaches the fluid gaps and the isolating grooves are in a portion of the substrate holder called the heat transfer plate, which can be associated with being part of the heating component or the cooling component as a means to transfer thermal energy, and thus can be considered either disposed in the heating component of the cooling component, or both, as broadly recited in the claims.

16.

***Claim Rejections - 35 USC § 103***

17. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

18. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

19. **Claims 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5730803 to Steger et al.**

20. The teachings of Steger et al are relied upon as set forth in the above 102 rejection of Claim 1.

21. In regards to Claims 5-7, Steger teaches the cooling component has an upper cap 330 and a lower cap 332, the lower cap comprising the plurality of channels 334 configured to receive a cooling fluid, as per the rejection of Claim 1 above, the upper cap being an implicit plate as 333 is a plate and lower caps brazed together such that there is an implicit brazing material positioned between the upper and the lower cap (Col. 6 lines 39-41).

22. Steger does not expressly teach that the upper cap has the cooling channels.

23. However, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to rearrange the upper and lower caps, such that the upper cap is now on top of the lower cap, since it has been held that rearranging parts of an invention involves only routine skill in the art. *In re Japikse*, 181 F.2d 1019, 86

USPQ 70 (CCPA 1950). *In re Kuhle*, 526 F.2d 553, 188 USPQ 7 (CCPA 1975). MPEP 2144.04-VI (c).

24. Furthermore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to reverse the upper and lower caps, since it has been held that a mere reversal of the essential working parts of a device involves only routine skill in the art. *In re Gazda*, 219 F.2d 449, 104 USPQ 400 (CCPA 1955). MPEP 2144.04 VI-A. The simple reversal of the upper and lower caps, such that the upper cap is not the lower cap and the lower cap is now the upper cap, the resulting lower cap being a plate having a flat top surface positioned adjacent to the upper cap, would fulfill all of the limitations of claims 5-7 without changing the operation of the structures.

25. **Claims 21-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5730803 to Steger et al in view of U.S. Patent Application No. 2002/0050246 to Parkhe and U.S. Patent No. 5280156 to Niori et al.**

26. The teachings of Steger et al are relied upon as set forth in the above 102 rejection of Claim 19.

27. In regards to Claims 21-25, Steger does not expressly teach the heating and cooling components comprise aluminum alloys, or the same aluminum alloy.

28. Parkhe teaches the cooling component (*Parkhe*, 107 and 238 Fig. 2A) are made of the same material (*Parkhe*, Para. 0046). Parkhe further teaches of a separate embodiment the upper cap (*Parkhe*, 107) is made of aluminum nitride (*Parkhe*, Para. 0049).



29. It has been held that the selection of a known material based on its suitability for its intended use supports a prima facie obviousness determination. See MPEP

2144.07. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). Thus it would be prima facie obvious to one of ordinary skill in the art at the time of the invention to make the upper cap out of aluminum nitride, an aluminum alloy.

30. Steger in view of Parkhe do not expressly teach the heating component is made of aluminum nitride.

31. Niori et al teach a wafer heating apparatus with a heating element (*Niori*, 3 *Fig. 1*, 3), i.e., heater, embedded in a ceramic substrate (*Niori*, 2 *Fig. 1*, 2a/b *Fig. 3*), i.e., a body portion (*Niori*, *Claim 1*, *Col. 4 lines 11-27*). Niori et al teach the body portion is made of aluminum nitride (*Niori*, *Col. 5 lines 45-64*) such that the embedded heater is implicitly case in the body of aluminum nitride, an aluminum alloy. Niori et al further teach that the heater has a supporting surface (*Niori*, 4A *Fig. 3*) for a substrate (*Niori*, W *Fig. 3*) that is mechanically connected to the heater via an adhesive material (*Niori*, 5A *Fig. 3*, and *Col. 6 line 50-Col. 7 line 31*).

32. It would have been obvious to one of ordinary skill in the art at the time of the invention, with a reasonable expectation of success, to alternatively substitute the heating component in Steger in view of Parkhe with the heating component as taught by Niori et al, as art-recognized equivalent means for providing heat to a substrate. It has been held that an express suggestion to substitute one equivalent component or process for another is not necessary to render such substitution obvious. *In re Fout*, 675 F.2d 297, 213 USPQ 532 (CCPA 1982). See MPEP 2144.06 II. The resulting

apparatus fulfills the limitations of claims 21-25, as the heating component and the cooling components are made of the same aluminum alloy, with a heater embedded in the body of the heating component.

**33. Claims 45-47 rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5730803 to Steger et al in view of U.S. Patent No. 6051074 to Strodbeck et al and U.S. Patent No. 6736206 to Hisai.**

34. At the outset, it is noted in regards to Claim 45 that the recitation of "means for" limitations are considered to invoke the provisions of 35 U.S.C. 112, sixth paragraph. This recitation has been interpreted in accordance with the Specification and the dependent claims to refer to the following:

Claim 45

- b. Means for cooling the supporting surface: a thermoelectric device (Claim 46, Para. 0038 of Specification).
  - c. Means for heating the supporting surface: a thermoelectric device and a channel configured to flow at least one of elevated temperature fluorinated dielectric liquid, water, and steam (Claim 46, Para. 0038 of Specification).
  - d. Means for receiving a fluid: channel (Claim 47, Para. 0038 of Specification).
  - e. Means for connecting the means for cooling and the means for heating: brazing, Paragraph 0036.
35. In regards to Claims 45-47, Steger teaches a substrate holder 300 Fig. 3A for supporting a substrate (implicitly on top surface 303) comprising a supporting surface

303, a cooling component 333 having a plurality of cooling channels 334 configured to receive a cooling fluid, a heating component 308, 310 positioned adjacent to the supporting surface 303 and between the supporting surface and the cooling component 333, a fluid gap 320 positioned between the cooling component and the heating component such that the fluid gap is interposed between the plurality of cooling channels of the cooling component and the heating component, the fluid gap configured to receive a fluid 322 to vary the thermal conductance between the cooling component and the heating component; and a brazing material 324 disposed at least along a peripheral region between the cooling component and the heating component as it is disposed adjacent the fluid gap to close the fluid gap at that top portion, i.e., provide a part of an enclosure which forms the fluid gap (Col. 2 lines 49-54, Col. 6 line 31-Col. 9 line 54). Steger teaches heating component is comprised of a body portion 308 and an embedded heater 310 disposed in the body portion, the body portion 301 being made of alumina, an aluminum alloy. Steger teaches the cooling component 333 comprises an upper cap 330 and a lower cap 332. Steger teaches the fluid gaps are cylindrical in shape, i.e., round grooves that are a portion of the substrate holder called the heat transfer plate, which can be associated with being part of the heating component or the cooling component as a means to transfer thermal energy, and thus can be considered either disposed in the heating component or the cooling component, or both, as broadly recited in the claims. Steger teaches at least one isolating groove, i.e., a plurality 318 positioned between the cooling component and the heating component, the isolating groove configured to prevent flow of the brazing material into

the fluid gap (see where brazing material 324 is separated from the fluid gap 320 by isolating groove 318).

36. Steger does not teach the means for cooling the supporting surface is a thermoelectric device.
37. Strodbeck et al teach a substrate support (*Strodbeck, 12*) where the cooling apparatus therein is a thermoelectric cooling unit (*Strodbeck, Col. 5 line 15-Col. 6 line 11, Claim 1*).
38. It would have been obvious to one of ordinary skill in the art at the time of the invention, with a reasonable expectation of success, to alternatively substitute the cooling component in Steger with the thermoelectric cooling means as taught by Strodbeck et al, as art-recognized equivalent means for providing cooling to the substrate support. It has been held that an express suggestion to substitute one equivalent component or process for another is not necessary to render such substitution obvious. *In re Fout*, 675 F.2d 297, 213 USPQ 532 (CCPA 1982). See MPEP 2144.06 II.
39. Steger in view of Strodbeck et al do not teach the means for heating comprises at least one of a thermoelectric device and a means for receiving fluid comprises a channel to flow at least one of the elevated temperature fluorinated dielectric liquid, water, and steam.
40. Hisai teaches a substrate support (*Hisai, 11 Fig. 1*) with a substrate placed thereon (*Hisai, W Fig. 1*) that is comprised of a heater (*Hisai, 17 Fig. 1*) that heats the working fluid, such as water (*Hisai, 16 Fig. 1, Col. 3 lines 53-55*) through an internal

space with a plurality of rims that implicitly form channels which move, or flow the liquid therein, thus being a means of heating as a thermoelectric device with a means of receiving a fluid in the means for heating to flow an elevated temperature liquid (*Hisai, Para. 0028-0032*).

41. It would have been obvious to one of ordinary skill in the art at the time of the invention, with a reasonable expectation of success, to alternatively substitute the heating component in Steger with the thermoelectric heating means and fluid receiving means as taught by Hisai, as art-recognized equivalent means for providing cooling to the substrate support. It has been held that an express suggestion to substitute one equivalent component or process for another is not necessary to render such substitution obvious. *In re Fout*, 675 F.2d 297, 213 USPQ 532 (CCPA 1982). See MPEP 2144.06 II. The resulting apparatus would fulfill the limitations of claims 45-47, as the substitution of the elements into Steger would have the same arrangement and means for connecting.

42. **Claim 49 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5730803 to Steger et al in view of U.S. Patent Application No. 2004/0144561 to Osanai et al.**

43. The teachings of Steger are relied upon as set forth in the above 102 rejection of Claim 1.

44. In regards to Claim 49, Steger teaches that the fluid gap can be adjusted (Col. 9 lines 1-5) as the thickness of the thermal grease can be adjusted.

45. Steger does not expressly teach the fluid gap is 50 um in distance.

46. Osanai teaches that thermal conduction grease has excellent heat sink characteristics at 50um, such that the heating components sufficient radiate (Para, 0043).

47. It would have been obvious to one of ordinary skill of the art at the time of the invention, to modify the thickness of the thermal grease, and thus the distance of the fluid gap as well, to make it have a thickness of 50um, as taught by Osanai. One would be motivated to do so in order to optimize the thickness of the thermal grease such that it has excellent heat sink characteristics.

#### ***Response to Arguments***

48. Applicant's arguments with respect to claims 1-31 and 45-47 have been considered but are moot in view of the new ground(s) of rejection.

49. Specifically, the teachings of Steger et al remedy all of the previous arguments. The teachings of references Parkhe, Strodheck, Hisai, and Niori are still applied against limitations of the dependent claims not argued against by Applicant.

#### ***Conclusion***

50. Any inquiry concerning this communication or earlier communications from the examiner should be directed to TIFFANY NUCKOLS whose telephone number is (571)270-7377. The examiner can normally be reached on Monday through Friday 9:00AM - 5:30 PM.

51. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571-272-1435. The fax phone

number for the organization where this application or proceeding is assigned is 571-273-8300.

52. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/TIFFANY NUCKOLS/  
Examiner, Art Unit 1716

/Parviz Hassanzadeh/  
Supervisory Patent Examiner, Art Unit 1716